



TYPE 65UV5-1004 CEX Integrated Flame Scanner with Internal Flame Relay and Analog Output



DESCRIPTION

The Fireye 65UV5-1004 flame scanner is a microprocessor based flame scanner utilizing an ultraviolet tube-type sensor, and electro-mechanical self-checking shutter mechanism.

The Fireye 65UV5-1004 flame scanner incorporates an internal flame relay with a fixed ON/OFF threshold thereby eliminating the need for an external flame amplifier. Models are available with a four-second or a one-second flame failure response time (FFRT). The 65UV5-1004 model also provides an analog 4 to 20mA output referenced to flame signal strength.

The Fireye 65UV5-1004 flame scanner is powered by 24 vdc. CEX models are wired directly via a terminal rail located within the CEX housing. Suitable glands must be used to terminate the cable at the housing. The picture above depicts the CEX scanner mounted on a heater.

APPLICATION

Fireye 65UV5 self-checking scanners are used to detect ultraviolet emissions from fossil fuel flames such as natural gas, coke oven gas, propane, methane, butane, kerosene, light petroleum distillates and diesel fuels.

PRINCIPLE OF OPERATION

The 65UV5 scanners use a UV-eye detector. This detector is a sealed, gas filled, UV-sensitive tube containing two electrodes connected to a source of DC voltage. When UV radiation of sufficient energy falls upon the electrodes, electrons are released and the inter-electrode gas becomes conductive, resulting in an electric current flow from one electrode to the other. The current flow starts and ends abruptly and is known as an "avalanche."

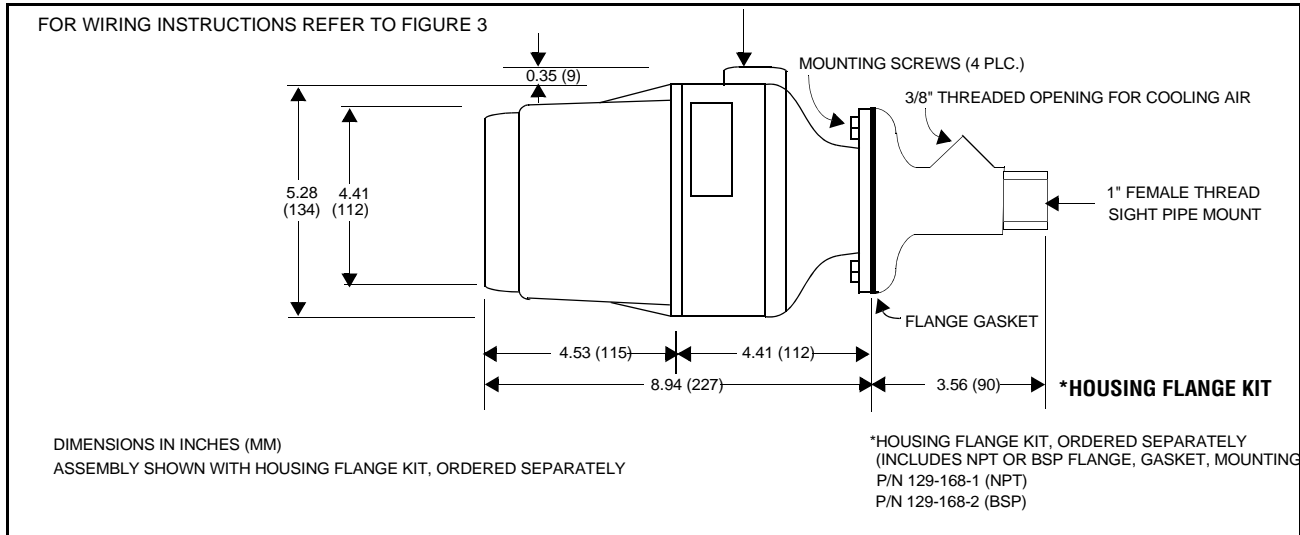
A very intense source of UV radiation will produce several hundred avalanches or pulses per second. With less radiation there will be fewer pulses per second. Upon total disappearance of flame, the detector output ceases. Thus, the presence or absence of pulses is an indication of the presence or absence of flame; the frequency of the pulses is a measure of flame intensity. When the pulses reach a sufficient level, the internal flame relay is energized.

FEATURES

The scanner includes an electro-magnetic shutter that permits a self-checking circuit to verify that the scanner and signal circuits are producing valid flame presence or absence information. During the shutter closed period, the detector's optical path is blocked from flame radiation, allowing the internal microprocessor to verify the proper operation of the ultraviolet tube. While the shutter is open, flame presence or absence is detected. The self-check shutter operation and fault diagnostics are fully described later in this bulletin.

SPECIFICATIONS

FIGURE 1. SIMPLICITY SCANNER in CENELEC HAZARDOUS AREA HOUSING (mounting flange kit ordered separately)



NOTE: All models of the Simplicity 65UV5-1004 CEX flame scanners are housed within a CENELEC and ATEX approved housing for application in EExd IIC T6 hazardous rated environment. In addition the CENELEC housing is designed to meet the requirements of IP66 (NEMA 4X).

SPECIFICATIONS

MECHANICAL:

Hazardous Classifications:

EExd IIC T6 ATEX

Cooling / Purge Air Requirements:

Source: Clean, dry, cool

Volume: 4 SCFM (113 l/min) at 3/4" threaded mounting flange, or 1 inch "Y" fitting, mounted on scanner sight pipe. Temperature near the upper limit of the scanner operating range and/or use with dirty/dusty fuels may require up to 15 SCFM (425 l/min).

Pressure: Adequate to overcome furnace or windbox pressure

Temperature Rating: -40° F to + 150°F (-40°C to +65°C) maximum dependent on "T" classification

Humidity: 0% to 95% relative humidity, non-condensing

ELECTRICAL:

Input Power: 24 Vdc, +10%, -15% supply current 100 mA

Electrical Connection: Internal terminal rail

Relay Output FLAME RELAY, SPST (N.O.)

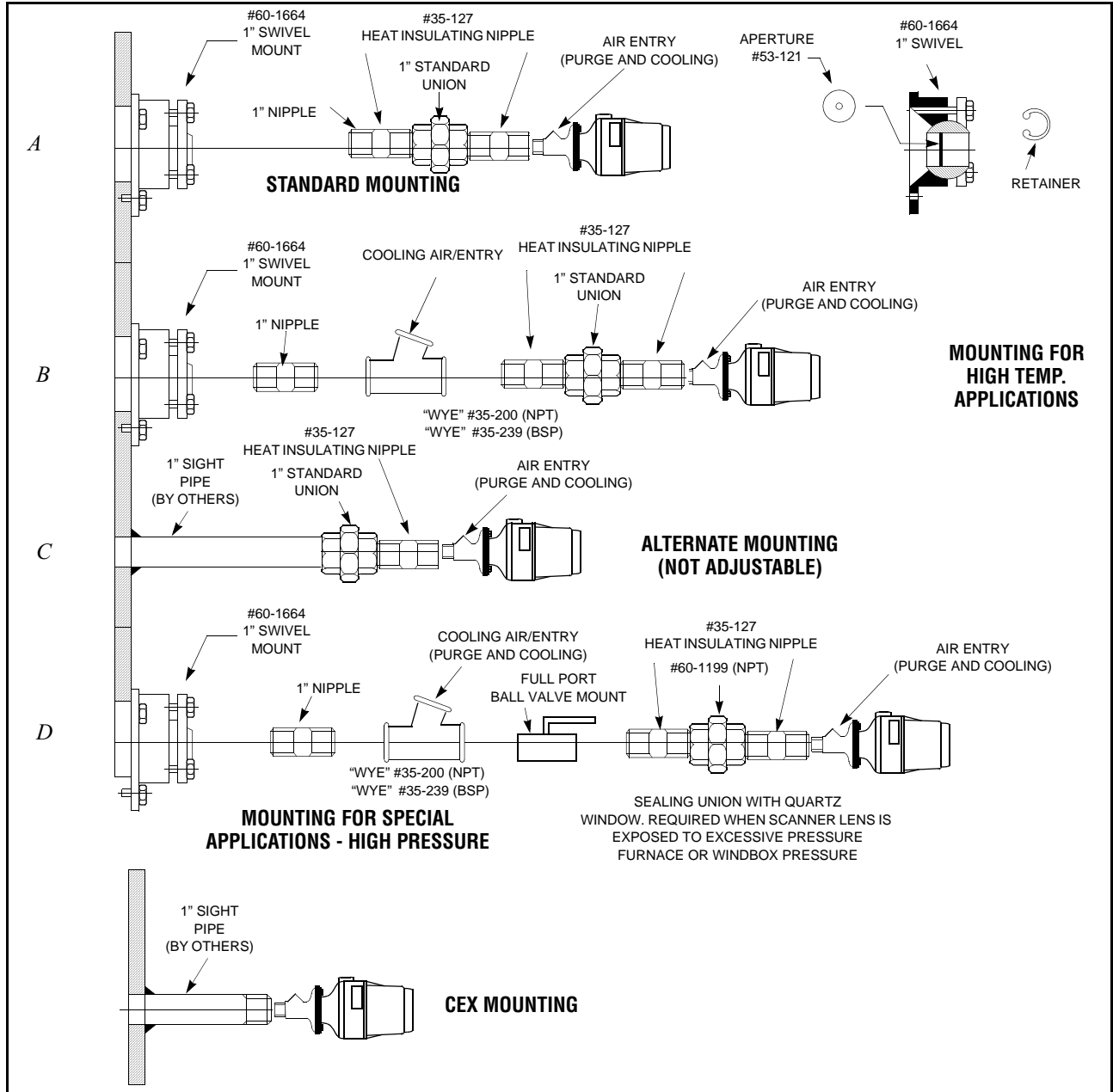
Contact Rating: Minimum: 10 mA @ 5 Vdc

Maximum: 2 A @ 30 Vdc

2 A @ 240 Vac

Status Indication: Internal LED: "Flame Signal", "Fault Indication"

FIGURE 2.



NOTE: Due to the 65UV5's integrated cable, it is recommended that a union always be installed in the mounting pipe to facilitate scanner removal.

SCANNER WIRING

The 65UV5-1004 CEX scanner includes an internal terminal rail. The two red leads provide the 24 vdc power. The two black leads access the normally open flame relay contact. The yellow lead provides the positive connection for the 4 to 20mA signal referenced to 24 volt vdc ground. A ground screw is provided on the front of the scanner and internally to cross bond.

To reduce electrical noise interference, take precautions to keep the scanner cable away from any high inductive wiring associated with high inductive loads or high voltage, high energy spark ignition systems.

CEX models are wired directly and have a terminal rail to connect which is located within the CEX housing. Suitable EX glands must be used to terminate the cable at the housing.



WARNING: Unit should be electrically protected by external fuses (see Fig. 3 for rating) to prevent damage to unit in case of a short or overload.

FIGURE 3.

SCANNER WIRING

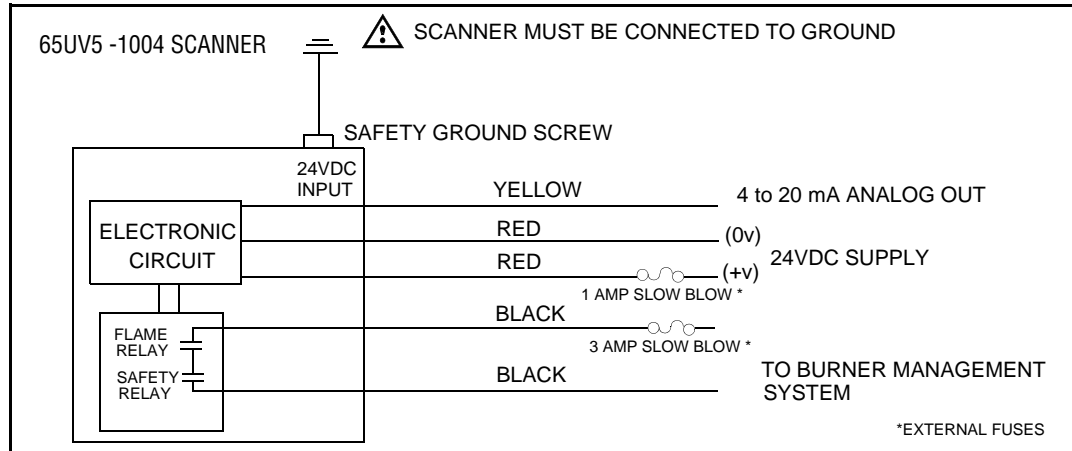
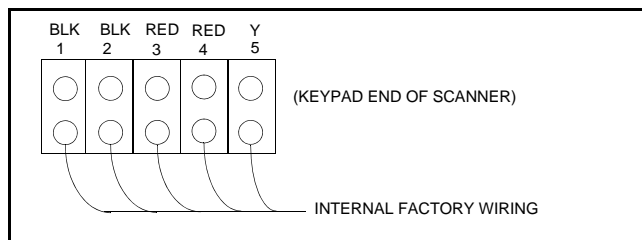


FIGURE 4.

WIRING OF SIMPLICITY MODEL 65UV5-1004 "CEX" SCANNERS

TERMINAL	FUNCTION	INTERNAL FACTORY WIRE COLOR
1	FLAME RELAY	BLACK
2	FLAME RELAY	BLACK
3	24 VOLT	RED
4	0 VOLT	RED
5	4 to 20mA	YELLOW



SELF-CHECK SHUTTER OPERATION

The 65UV5 self-check shutter mechanism is a powered-open, powered-closed device (no return spring). The open/closed shutter period is variable and controlled by the scanner's microprocessor.

Upon initial 24 vdc power application, the shutter will close and open once to verify proper operation. The shutter will then remain open until a UV flame source is present and the internal flame relay (RF) is energized.

When the flame relay (RF) is energized, the shutter will be driven closed once every 13.5 seconds. The amount of time the shutter will remain closed is determined by the scanner's microprocessor and is dependent upon the UV tube's response. The amount of time closed can vary between 50 ms and 300 ms.

In the event of a self-check failure the flame relay will de-energize.



INDICATION LEDs

The 65UV5 contains a color coded internal LED that indicates flame status and alarm condition per the following table.

Table 1:

LED STATUS		CONDITION	FLAME RELAY (RF) STATUS	*SHUTTER POSITION	
				OPEN	CLOSED
GREEN	OFF	NO FLAME DETECTED	OFF		
	RAPID FLASHING RATE	MARGINAL FLAME SIGNAL	ON		
	SLOW FLASHING RATE	NORMAL FLAME SIGNAL	ON		
	STEADY ON	HIGH FLAME SIGNAL	ON		
RED	OFF	NORMAL	ON		
	FLASHING	*SELF-CHECK FAILURE (observe shutter position)	OFF	SHUTTER FAILURE	UV TUBE FAILURE
	ON	MICROPROCESSOR ERROR	OFF		

Important Note: Removing the power will reset the LED and shutter diagnostic indication.



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